

CLAIMS

What is Claimed is:

- 1 1. A method of preparing a pyrrole comprising the step of:
 - 2 reacting a donor-acceptor cyclopropane with a nitrile in the presence of an
 - 3 effective Lewis acid catalyst.
- 1 2. The method of claim 1, wherein the Lewis acid is trimethylsilyl
- 2 trifluoromethanesulfonate.
- 1 3. The method of claim 1, wherein at least one substituent group is selectively
- 2 positioned in the cyclopropane.
- 1 4. The method of claim 3, wherein the position of the substituent in the resulting
- 2 pyrrole is optionally at the the 4-positon, the 5-position or both the 4 and 5 positions.
- 1 5. The method of claim 1, wherein the stereochemistry of the cyclopropane has
- 2 no effect on reaction efficiency.
- 1 6. The method of claim 1, wherein the pyrrole preparation is compatible with at
- 2 least one protective group.
- 1 7. The method of claim 6, wherein the protective group is optionally a silylene, a
- 2 benzyl ether or an acetate.
- 1 8. The method of claim 1, wherein the pyrrole is unsymmetrical.
- 1 9. The method of claim 1, wherein the cyclopropane has a C(2) substituent that
- 2 is an electron withdrawing group.
- 1 10. The method of claim 1, wherein the reaction is used to generate combinatorial
- 2 libraries.

1 11. A synthesis reaction comprising:

2 a donor-acceptor cyclopropane;

3 an aliphatic, aromatic, branched, α,β -unsaturated, aryl, or otherwise functionalized

4 nitrile; and

5 a Lewis acid activator, wherein the synthesis reaction requires cycloaddition,

6 dehydration and tautomerization.

1 12. The synthesis reaction of claim 12, wherein the cyclopropane has a substituent

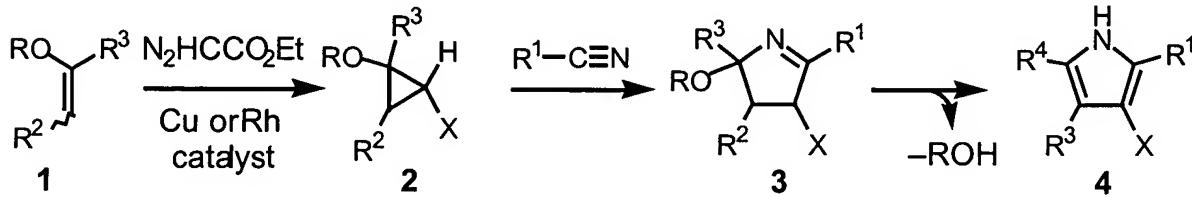
2 at C(2) that is an electron withdrawing group.

1 13. The synthesis reaction of claim 12, wherein the pyrrole is formed without the

2 formation of multiple constitutional isomers.

1 14. A method for the synthesis of di-, tri- and tetrasubstituted pyrroles comprising

2 the following steps:



3 wherein RO is a carboxylate group; R¹, R², R³ and R⁴ are each independently aryl or

4 alkyl groups or hydrogen; the nitrile is aliphatic, aromatic, branched, α,β -unsaturated, or

5 otherwise functionalized; X is an ester or ketone; and Y is a Lewis acid.

1 15. The method of claim 14, wherein compound 4 is unsymmetrical pyrrole.

1 16. The method recited in claim 14, wherein compound 4 is a 3,4-dihydro-2H-

2 pyrrole.